presso-conicis, basi rhomboideis; areolis junioribus tomentosis, reliquis nudis; aculeis radiantibus 22 brevissimis, setiformibus, interioribus 5–6–8 elongatis et horum uno quandoque centrali; omnibus levi tactu deciduis, niveis, centralibus apice rufis.

Mammillaria recurvispina.

M. simplex, glaucescens, subgloboso-depressa, mammillis conico-obtusis, crassis; areolis et axillis nudis. Aculei 8. Unus supremus tenuissimus, infimus longissimus crassior, reliqui tria paria efformant opposita. Omnes sunt reflexi, curvati, radiantes.

Notices respecting *Pæderia*; by P. W. Korthals. The author remarks, that as *Musca vomitoria* is misled by the peculiar smell of the Aroideæ, just so is *M. sarcophaga* misled by plants of this genus.—Description of the Gœttingen Botanic Garden; by Dr. J. F. Hoffmann.—Botanical Notices, by Dr. J. F. Hoffmann: On *Lemna arrhiza*; On the Occurrence of Petiolated Hairs in *Villarsia nymphæoides* and other Aquatic Plants; On the Spontaneous Ignition of *Dictamnus albus*.—F. A. G. Miguel De *Encephalarto horrido*, Lehm., ejusque formis.—Botanical Notices, by C. Mulder: Vegetable Monstrosities.—J. Van der Hoeven on the Heart of the Crocodiles, with an account of our knowledge thereof.—Dr. H. Schlegel on the Nostrils in Sula.—*Notices of Works:* Huschke De Bursæ Fabricii origine; Gould's Birds of Australia; Imhoff's Genera Curculionidum.

No. III.

Anatomy of the Scorpion Fly (*Panorpa communis*); by Dr. A. Brants.—Dr. A. J. D. Steenstra Toussaint De Systemate Uropœtico *Squali glauci*.—Q. M. R. Verhuell on the Differences between *Pieris Napi* and *Pieris Rapæ*.—H. C. Van Hall on the Increase of Trees in Thickness.—A. C. C. F. Van Winter's Geognostical Notices of the Basalts of the Central Rhine.—*Notices of Works:* Analysis of the New Transactions of the First Class of the Royal Institute of the Netherlands; Archives du Muséum d'Histoire Naturelle; Mayer's Comparative Anatomy; Van Deen's Anatomical Description of a monstrous 6-legged Frog; H. Schlegel's Drawings of Amphibia, 2nd Decade; J. Muller on the Auditory Organs in the *Cyclostomi*; Peligot and Decaisne on Sugar Beet-root.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

Nov. 18, 1840.—Read the first part of a Memoir on the Evidences of Glaciers in Scotland and the North of England, by the Rev. Prof. Buckland, D.D., Pres. G.S.

Dr. Buckland's attention was first directed by Prof. Agassiz in October 1838 to the phænomena of polished, striated, and furrowed surfaces on the south-east slope of the Jura, near Neuchâtel, as well as to the transport of the erratic boulders on the Jura, as the effects of ice; but it was not until he had devoted some days to the examination of actual glaciers in the Alps, that he acquiesced in the correctness of Prof. Agassiz's theory relative to Switzerland. On his return to Neuchâtel from the glaciers of Rosenlaui and Grindelwald, he informed M. Agassiz that he had noticed in Scotland and England phænomena similar to those he had just examined, but which he had attributed to diluvial action: thus in 1811 he had observed on the head rocks on the left side of the gorge of the Tay, near Dunkeld, rounded and polished surfaces; and in 1824, in company with Mr. Lyell, grooves and striæ on granite rocks near the east base of Ben Nevis. About the same time Sir George Mackenzie pointed out to the author in a valley near the base of Ben Wyvis, a high ridge of gravel, laid obliquely across, in a manner inexplicable by any action of water, but in which, after his examination of the effects of glaciers in Switzerland, he recognizes the form and condition of a moraine.

After these general remarks, Dr. Buckland proceeds to describe the evidence of glaciers observed by him in Scotland last autumn, partly before and partly after an excursion, in company with Prof. Agassiz; but he forbears to dwell on the phænomena of parallel terraces, though he is convinced that they are the effects of lakes produced by glaciers.

The district which Dr. Buckland examined previously to his excursion with Prof. Agassiz, lay in the neighbourhood of Dumfries; and the line of country which he investigated subsequently, extended in Scotland from Aberdeen to Forfar, Blair Gowrie, Dunkeld, and by Loch Tumel and Loch Rannoch to Schiehallion and Taymouth, and thence by Crief, Comrie, Loch Earn Head, Callender and Stirling, to Edinburgh; and in England by Berwick, Wollar, the Cheviots, Penrith, and Shap Fell, to Lancashire and Cheshire.

Moraine near Dumfries.—The picturesque ravine of Crickhope Linn, about two miles north of Closeburn, and one mile east of Thornhill, intersects nearly horizontal strata of new red sandstone, and is traversed by the Dolland rivulet. On emerging from the upper end of the ravine a long terminal moraine is visible, stretching nearly across the mountain valley, from which the Dolland Burn descends to fall into Crickhope Linn; and it resembles, when viewed from a distance, a vallum of an ancient camp, being covered with turf. It is formed principally of an unstratified mass of rolled pebbles, derived from the slates of the adjacent Lowder Hills, with a few rounded fragments of granite, the nearest rock of which *in situ* is that of Loch Doon, in Galloway, thirty miles to the north-west. Its height varies from twenty to thirty feet; its breadth at the base is about one hundred feet, and its length is four hundred yards. At the southern extremity it is traversed by the Dolland rivulet, and at the northern by the Crickhope Water; and in the centre it is intersected by a road.

Moraines in Aberdeenshire.—Dr. Buckland considers the gravel and sand which cover the greater part of the granite table-land from Aberdeen to Stonehaven to be the detritus of moraines; and the large insulated tumuli and tortuous ridges of gravel, occupying one hundred acres, near Forden, a mile east of Achinbald, to be terminal moraines; also the blocks, large pebbles, and small gravel spread over the first level portions of the valley of the North Esk, after emerging from the Sub-Grampians, to be the residue of moraines re-arranged by water.

Moraines in Forfarshire.—The cones and ridges of gravel at Cortachy and Piersie, near Kirriemuir, and at the confluence of the Carity valley with that of the Proson, are considered by Dr. Buckland to have been produced by glaciers, and modified in part subsequently by water. The polish and striæ on a porphyritic rock near the summit of the hill, on the left side of the main valley, and immediately above the moraines, he is of opinion must also be assigned to glacier action. The vast longitudinal and insulated ridges of gravel, extending for two or three miles up the valley east of Blair Gowrie, and the transverse barriers forming a succession of small lakes in the valley of the Lunanburn, to the west of that town, he considers to be moraines; likewise the lofty mounds comprising the ornamental grounds adjacent to Dunkeld Castle; the detritus covering the left flank of the valley of the Tay, along a great part of the road from Dunkeld to Logierait; that on the left flank of the Tumel valley from Logierait to Killicrankie; and on the left flank of the Garrie, from Killicrankie to Blair Athol.

The vast congeries of gravel and boulders on the shoulder of the mountain, exactly opposite the gorge of the Tumel, Dr. Buckland is of opinion was lodged there by glaciers which descended the lateral valley of the Tumel from the north side of Schiehallion and the adjacent mountains, and were forced across the valley of the Garry, in the same manner as modern glaciers of the Alps (that of the Val de Bagne, for example,) descend from the transverse, and extend across the longitudinal valleys. Dr. Buckland mentions the mammillated, polished and striated slate rocks, about one mile above the falls of the Tumel, on the left portal of the gorge of the valley, as the effects of a glacier which descended the gorge: he notices also the rounded outline and polish on veins of quartz, which project eight or ten inches above the weathered surfaces of masses of mica slate near the same locality. Similar mammillated masses of mica slate retaining striæ and flutings are visible at Bohaly, one and a half miles east of Tumel Bridge.

Evidences of Glaciers on Schiehallion.—The north and north-east shoulders of the mountain present rounded, polished, and striated surfaces, many of which have been recently exposed by the construction of new roads. On the left flank of the valley called the Braes of Foss, and near the thirteenth milestone, a newly-exposed porphyry dyke, forty feet wide, exhibited a polished surface and striated, parallel to the line of descent which a glacier from Schiehallion would take; and on the right flank, one hundred yards north of the eleventh milestone, another and smaller dyke of porphyry presented similar phænomena. In the intermediate space the recently uncovered slate rocks and quartzite are rounded, polished, grooved, and striated, parallel to the direction which a glacier would assume where each surface is situated.

Moraines at Taymouth.—Two lofty ridges of gravel, which cross the park at right angles to the sides of the valley between the village of Kenmore and Taymouth Castle, the hill, on which stands an ornamental dairy-house, and the gravel, on which are situated the woods overhanging the left bank of the lower end of Loch Tay, Dr. Buckland considers to be moraines, or the detritus of moraines; also the deeply-scored and fluted boulders of hornblende rock, with other debris near Fortingal, at the junction of Glen Moulin with Glen Lyon.

Moraines in Glen Cofield.—A remarkable group of moraines occurs on the high lands which divide the valleys of the Tay and the Bran; and between the sixteenth and fourteenth milestones thirty or forty round-topped moraines, from thirty to sixty feet high, are crowded together like sepulchral tumuli. These mounds, composed of unstratified gravel and boulders, Dr. Buckland says cannot be referred to the action of water, as they are placed precisely where a current descending from the adjacent high lands would have acted with the greatest velocity; and they exactly resemble some of the moraines in the valley of the Rhone, between Martigny and Löek. The village of Amulrie is considered by the author to stand on a group of low moraines; and the road for two or three miles from it, towards Glen Almond, to traverse small moraines or surfaces of mica slate, rounded by glaciers. A few conical moraines appear also on the high lands between Glen Almond and Crieff.

Proofs of Glaciers in and near Strath Earn.—This part of the valley of the Earn is flanked irregularly with ridges and terraces of gravel, the detritus of moraines; and on its north side, in the woods adjacent to Lawers House, near Comrie, hard slaty rocks of the Devonian or old red sandstone system have been rounded and striated. At the west end of Comrie, near the bridge, blue slate rocks have been also rounded and guttured.

Evidence of Glaciers near Comrie.—In this district Dr. Buckland tested the value of the glacial theory by marking in anticipation on a map the localities where there ought to be evidences of glaciers having existed, if the theory were founded on correct principles. The results coincided with the anticipations. On a hill above the gorge, called the Devil's Caldron, near Fentallich, are rounded surfaces of greenstone, partially covered by moraines; and at Kenagart, also immediately above the Devil's Caldron, is a small cluster of moraines, easily separable into lateral and terminal. Two miles up the valley a medial moraine forms a ridge on the level ground, in front of the confluence of Glen Lednoch and Glen Garron. The farmhouse of Invergeldy is stated to stand on the detritus of a moraine, and the glen descending to it from Ben-na-cho-ny to be partially obstructed with moraines. The surface of the granite at Invergeldy, which supplied the stone for Lord Melville's monument at Crieff, is rounded and mammillated, but too much weathered to present a polish or striæ. On a hill of trap, however, half a mile south of the farm of Lurg, there is a distinct polish, striated in the direction which a glacier descending the subjacent valley would assume. In

Glen Turret, on the shoulder of the mountain immediately above the south-west extremity of Loch Turret, a very deep ravine intersects a vast lateral moraine, which Dr. Buckland shows must have been lodged there whilst the Loch was a mass of ice, and the valley above it filled with a glacier more than five hundred feet above the present level of the lake. At the falls of the Turret, at the lower extremity of the gorge, is an extensive lodgement of moraines; and at the upper end, on the left bank of the Turret, near a gate which crosses the road, the slate-rocks are polished and furrowed; and at both these localities Dr. Buckland had anticipated that glacial action ought to be found.

Evidence of Glaciers near Loch Earn.—On the north bank of the Loch rounded and furrowed surfaces and portions of lateral moraines are exposed by the roadside; and at Loch Earn Head is a group of conical moraines at the junction of Glen Ogle with Loch Earn, and at the very point where, had they been brought by a rapid current, they would have been propelled into the Loch. It is nevertheless the exact position where the terminal moraine of a glacier would be deposited.

Moraines near Callender.—Moraines are stated to cover more or less the valley of the Teith from Loch Katherine to Callender, and the lofty terraces flanking the valley from Callender to Doune are considered to be the detritus of moraines, modified by the great floods which accompanied the melting of the ice. One of them, near Callender, has been mapped as the vallum of a Roman camp. The little lakes on the right bank of the Teith, four miles east of Callender, Dr. Buckland considers due to moraines obstructing the drainage of the country; and the greater part of the first table-land on the right bank of the Teith, between Callender and Doune, including the portion on which stands Mr. Smith's farm, to be composed of re-arranged glacial detritus.

Proofs of Glacial Action at Stirling and Edinburgh.—Having thus shown that glaciers once existed in the glens and mountainous districts of Scotland, Dr. Buckland proceeds to point out the evidence of glacial action at points but little raised above the level of the sea, and distant from any lofty group of mountains. In 1824 he had noticed that the trap-rock then recently exposed on the summit of the hill, between the castle and the church, was polished and striated, but at his last visit in 1840 these evidences had become obliterated by weathering. The grooves and scratches described by Sir James Hall on the Costorphine hills near Edinburgh, and on the surface of Calton Hill, Prof. Agassiz is of opinion cannot be explained by the action of water; but they resemble, he says, the effects produced by the under-surface of modern glaciers. In his recent examination, in company with Mr. McLaren, of the Castle Rock at Edinburgh, Dr. Buckland found further proofs of the correctness of the glacial theory, by discovering at points where he anticipated they would occur, namely, on the north-west angle of the rock, distinct striæ upon a vertical polished surface; and at its base a nearly horizontal portion of rock, covered with deep striæ; also on the south-west angle obscure traces of striæ and polished surfaces*. Some of these effects may be imagined to have been produced by stones projecting from the sides or bottom of floating masses of ice; but it is impossible, Dr. Buckland observes, to account by such agency for the polish and striæ on rocks at Blackford Hill, two miles south of Edinburgh, pointed out to him by Lord Greenock in 1834. On the south face of this hill, at the base of a nearly vertical cliff of trap, is a natural vault, partly filled with gravel and sand, cemented by a recent infiltration of carbonate of lime. The sides and roof of the vault are highly polished, and covered with striæ, irregularly arranged with respect to the whole surface, but in parallel groups over limited extents. These striæ, Dr. Buckland says, cannot be referred to the action of pebbles moved by water; 1st, because fragments of stone set in motion by a fluid cannot produce such continuous parallel lines; and 2ndly, because if they could produce them, the lines would be parallel to the direction of the current: it is impossible, he adds, to refer them to the effects of stones fixed in floating ice, as no such masses could have come in contact with the roof of a low vault. On the contrary, it is easy, he says, to explain the phænomena of the polish by the long-continued action of fragments of ice forced into the cave laterally from the bottom of a glacier descending the valley, on the margin of which the vault is placed; and the irregular grouping of the parallel striæ to the unequal motion of different fragments of ice, charged with particles of stone firmly fixed in them, like the teeth of a file. The cave is not three hundred feet above the level of the sea, and the proving of glacial action at this point justifies, the author states, the belief that glaciers may also at that period have covered Calton Hill and the Castle Hills of Edinburgh and Stirling.

Dec. 2.—The second part of Dr. Buckland's Memoir on the Evidence of Glaciers in Scotland and the North of England, was read.

The first part of the Memoir concluded with an account of glacial phænomena in the neighbourhood of Edinburgh (see *antè*, p. 326); and the line of country more particularly described in this portion extends southward from Edinburgh by Berwick, Newcastle, the Cheviots, the lake districts of Cumberland and Westmoreland, Kendal and Lancaster, to Shap Fell. A large portion of the low lands between Edinburgh and Haddington is composed of till or unstratified glacier-mud containing pebbles. In the valley of the North Tyne, about one mile east of Haddington, is a longitudinal moraine midway between, and parallel to, the river and the high road; and Dr. Buckland directs attention to the trap-rocks which commence a little further eastward, and are intersected by the Tyne for four or five miles above Linton, as likely to present scored and striated surfaces, where the valley is most contracted. Four miles west of Dunbar another long and lofty ridge of gravel stretches along the right bank of the river; and for three miles to the south-east of Dunbar extends a series of terraces or modified lateral moraines. In the high valleys at the east extremity of the Lammermuir hills, between Cockburn's Path and Ayton, moraines dispersed in terraces are also visible at various heights on both sides of the river; and on the left margin of the estuary of the Tweed, three miles north of Berwick, round tumuli and oblong mounds of gravel are lodged on the slope of a hill 300 or 400 feet above the level of the sea.

---

* In October 1840, Mr. McLaren found a polished surface on a portion of rock near the south-west base of Arthur's Seat.

Dr. Buckland has in his possession lithographs copied from drawings made by Mr. James Hall, of distinct west and east furrows which extend over a portion of the north side of the summit of Calton Hill, and on the surface of the carboniferous sandstone at Craig Leith Quarry. Dr. Buckland saw similar dressings in 1824 in a sandstone quarry near the house of Lord Jeffrey, two miles west of Edinburgh; and in 1840, in a railway section at Bangholm Bower, one mile north-east of Edinburgh, he found in stratified till and sand many striated and fluted boulders.

Moraines in Northumberland.—On many parts of the coast of Northumberland, especially near Newcastle, deposits of till rest upon the carboniferous rocks. At the village of North Charlton, between Belford and Alnwick, Mr. C. Trevelyan pointed out to Dr. Buckland in 1821, a tortuous ridge of gravel which was supposed to be an inexplicable work of art; but which he became convinced, after an examination in 1838 of the upper glacier of Grindelwald and that of Rosenlaui, is a lateral moraine. Dr. Buckland was prevented from examining the gorges through which the Burns descend from the eastern extremity of the Cheviots, but he directs attention to them as points where striæ and other proofs of glacial action may be found. Immediately below the vomitories of the eastern valleys of the Cheviots, enormous moraines are stated to cover a tract four miles from north to south, and two from west to east; and the high road to wind among cultivated mounds of them from near Woller, through North and South Middleton, and by West and East Lillburn to Rosedean and Wooperton. On the left bank of the College Burn*, immediately above the bridge at Kirknewton, Dr. Buckland discovered last autumn a moraine thirty feet high, stratified near the top to the depth of a few feet, but composed chiefly of unstratified gravel, inclosing fragmentary portions of a bed of laminated sand about three feet thick. Some of these fragments were in a vertical position, others were inclined, and the laminæ of which they were composed, were, for the greater part, variously contorted. He is of opinion that these detached portions were severed from their original position, moved forward, and contorted by the pressure of a glacier, which descended the deep trough of the College Burn from the northern summit of the Cheviots.

Evidence of Glaciers in the mountains of Cumberland and Westmoreland.—Proofs of glacial action, Dr. Buckland says, are as abundant throughout the lake districts and in the districts in front of the great vomitories through which the waters of the lakes are discharged, as in Scotland and Northumberland. Thus, in the vicinity of Penrith, near the junction of the Eden with the Eamont and the Lowther, are extensive moraines loaded with enormous blocks of porphyry and slate, brought down, Dr. Buckland observes, by glaciers, which descended from the high valleys on the east flanks of Helvellyn, and in the mountains around Patterdale, into the lake of Ulleswater (considered to be then occupied by ice), and from the valleys by which the tributaries of the Lowther descend from the east flank of Martindale, from Haweswater and Mardale. A remarkable group of these moraines is by the road side near Eden Hall four miles east of Penrith; and the detritus of moraines is stated to occupy the greater part of the valley of the Eamont, from Ulleswater to its junction with the Eden. On the southern frontier of these mountains in Westmoreland and Lancashire similar moraines occur on an extensive scale. Thus, immediately below the gorge through which the Kent descends from the mountains of Kentmere and Long Sleddale, many hundred acres of the valley of Kendal are covered with large and lofty insulated piles of gravel; and smaller moraines, or their detritus, nearly fill the valley from Kendal to Morecombe Bay. Five miles north-east of Kendal, on the high road from Shap, on the shoulder of the mountain in front of the valley of Long Sleddale, and at an elevation of 500 feet, a group of moraines occupies about 200 acres, and is distinguished from the adjacent slate rocks by a superior fertility. On the south of Kendal, the high roads from Burton and Milnthorpe to Lancaster, pass for the greater part over moraines or their detritus; and Lancaster Castle, placed in front of the vomitory of the Lune, is stated to stand on a mixed mass of glacial debris, probably derived from the valley of the Lune. The districts of Furness, Ulverston, and Dalton are extensively covered with deep deposits of glacier origin, derived from the mountains surrounding the upper ends of Windermere and Coniston lakes; and they contain a large admixture of clay, in consequence of the slaty nature of many of the mountains. A capping of till and gravel, thirty to forty feet thick, overlies the great vein of hæmatite near Ulverston. The numerous boulders upon the Isle of Walney also indicate the progress of the moraines from Windermere and Coniston to the north-west extremity of Morecombe Bay.

---

* For a notice by the late Mr. Cully, of a sudden flood in this district in 1830, see Proceedings of the Geological Society, vol. i. p. 149.

Dr. Buckland was prevented from personally examining, during his late tour, the south-west and west frontiers of the Cumberland mountains, but he conceives that many of the conical hillocks laid down on Fryer's large map of Cumberland, in the valley of the Duddon, at the south base of Harter Fell, are moraines; that some of the hillocks in the same map on the right of the Esk, at the east and west extremities of Muncaster Fell, are also moraines formed by a glacier which descended the west side of Sca Fell; and that many of the hillocks near the village of Wastdale were formed by moraines descending westward. Dr. Buckland is likewise convinced that moraines exist near Church in the Valley; also between Crummoch Water and Lorton, in the valley of the Cocker; and near Isle, in the valley by which the Derwent descends from Bassenthwaite lake towards Cockermouth, though there are no indications of them on Fryer's map.

Near the centre of the lake district are extensive medial moraines on the shoulder of the hill called the Braw Top, and formed by glaciers at the junction of the valley of the Greta with that of Derwent Water.

Dr. Buckland had no opportunity of seeking for polished and striated surfaces in the high mountain valleys of the lake district; but he found them on a recently exposed surface of greywacke in Dr. Arnold's garden at Fox Howe near Ambleside; likewise near the slate quarry at Rydal; and on newly bared rocks by the side of the road ascending from Grassmere to the Pass of Wythburn; he is also of opinion that many of the round and mammillated rocks at the bottom of the valley, leading from Helvellyn by the above localities to Windermere, owe their form to glacial action.

The remarkable assemblage of boulders of Criffle granite at Shalkbeck, between Carlisle and Cockermouth, Dr. Buckland conceives may have been transported across the Solway Frith on floating masses of ice, in the same manner as the Scandinavian blocks are supposed to have been conveyed across the Baltic to the plains of Northern Germany.

Dispersion of Shap Fell Granite by Ice.—The difficulties which had long attended every attempt to explain the phænomena of the distribution of the Shap Fell boulders, Dr. Buckland considers, are entirely removed by the application of the glacial theory. One of the principal of these difficulties has been to account for their dispersion by the action of water; northwards along the valley, descending from Shap Fell to Shap and Penrith; southwards in the direction of Kendal and Morecombe Bay; and eastward, over the high table-land of Stainmoor Forest, into the valley of the Tees, as far as Darlington. A glacier descending northwards from the Fell would, on the contrary, carry with it, Dr. Buckland says, blocks to the village of Shap, and strew them thickly over the space where they are now found; another, taking a southern course, would drop the boulders on the hills and valleys over which the road descends by High Borough Bridge to Kendal; and a third great glacier, proceeding eastwards betwixt Crosby, Ravensworth, and Orton, would cross transversely the upper part of the valley of the Eden, near Brough, and accumulate piles of ice against the opposite escarpment until they overtopped its lowest depression in Stainmoor Forest, and disgorged their moraines into the valleys of the Greta and the Tees. There are abundant proofs, Dr. Buckland states, of the existence of this glacier in large mud and boulder moraines, in the ascent of the gorge between Shap Fell and Birbeck Fell, and in the furrows and striæ, as well as the mammillated forms of the rocks at the portals of the gorge, particularly on the northern side. In the physical structure of this neighbourhood, Dr. Buckland points out other conditions which would have facilitated the accumulation of glaciers, as the lofty mountains of Yardale Head, which overtop Shap Fell on the north-west, and the still higher mountains to the west, whose snows must have nourished enormous glaciers; and he concludes by stating that Professor Agassiz, during an independent tour, arrived at similar conclusions respecting the mode by which the Shap boulders were distributed.

ZOOLOGICAL SOCIETY.

August 25, 1840.—W. H. Lloyd, Esq., in the Chair.

Two papers were read, in which the authors resume the descriptions of the Shells collected by H. Cuming, Esq., Corr. Memb., in the Philippine Islands, who exhibited specimens in illustration of the papers.

The first of these papers is from W. J. Broderip, Esq.

Bulinus Dryas. *Bul. testâ elongato-ovatâ, vix subdiaphanâ, peristomate interrupto, crassiusculo, lato, expanso, subrecurvo; nitidè albâ vel flavescente brunneo castaneove vittatâ.*

Var. *a. alba, anfractu basali trivittato, vittâ superiore et inferiore striis nigro-fuscis; mediâ castaneâ, nonnunquam interruptâ.*

This variety is sometimes yellowish, and the three bands on the body-whorl are nearly uniform chestnut.

Var. *b. anfractu basali bicincto, vittâ superiore angustâ, vittâ inferiore tristrigatâ.*

Var. *c. anfractu basali nitidè albo, vittâ superiore et inferiore angustis nigrescentibus limbato.*

Var. *d. Pallidè flava fasciâ suturali albente, anfractu basali vittâ superiore et inferiore angustissimis, castaneis limbato; cæteris castaneo univittatâ.*

Var. *e. Tota alba.*

Hab. ad Mansalai in insulâ Mindoro.

Legit H. Cuming in sylvis.

Mr. Cuming informs us that the animal of this elegant shell, which in the form of the spire and the distribution of the colouring, though not in the colouring itself, reminds the observer of *Achatinæ fasciata, emarginata* and *virginea* of Swainson (Zool. Ill.), varies much. In all the varieties the broadly expanded lip is white, both above and below, and the bands of the body-whorl terminate abruptly upon its upper part, so that the shell almost looks as if the wide white lip had been added to some of the Riband *Achatinæ*, for varieties of which some of the young might be taken by a cursory observer. The animal was ash-coloured, darker above. General length of the shell about two inches; width of body-whorl from $\frac{6}{8}$ths to $\frac{7}{8}$ths of an inch.

Bulinus Sylvanus. *Bul. testâ elongato-ovatâ, subdiaphanâ, subpyramidali, anfractibus ventricosioribus, fuscâ castaneo vittatâ, strigis et maculis flaventibus vel albentibus, longitudinalibus pictâ; peritremate interrupto, columellæ basi subsinuatâ, aperturâ subauriculari; labro expanso, recurvo.*

Var. *a. Fusca vel flavescens fasciâ suturali tenui albâ, apice pur-*

purascente, anfractu basali castaneo trifasciato, fasciis inferioribus maximis, strigis angulatis longitudinalibus picto, anfractibus cæteris frequentissimè longitudinaliter strigatis et maculatis.

Var. *b. Nitidè flavescens, anfractu basali castaneo quadrivittato.*

Var. *c. Flavescens anfractu basali bivittato.*

Several of this variety have traces of the longitudinal zigzag lines and spots upon the body-whorl.

Var. *d. Ventricosior, anfractu basali trivittato, apice purpurascente, vittis nigricantibus.*

Var. *e. Sordidè fusca strigis et maculis angulatis elongatis obscurè sparsa.*

Var. *f. Tota flavescens, lineâ tenuissimâ suturali albâ, gracilior.*

Hab. In insulâ Mindoro.

Legit H. Cuming in sylvis.

Some of the varieties of this fine shell, especially variety *b*, will remind the observer, at first sight, of the species last described; but Mr. Cuming informs us that the animal is reddish brown, and, besides other differences in the shell, the colouring-matter, instead of stopping short at that point of the body-whorl, just where the lip begins to expand, is continued on to the very rim, which is in most instances bordered with it; nay, the colour generally becomes more intense upon the upper part of the expansion. Varieties *d.* and *e.* were found at Calapan; varieties *c.* and *f.* at Puerto Galero. The latter variety has generally a chestnut oblique stripe or spot at the bottom of the whorl and on the upper expansion of the outer lip, continued from above the *columella*. Sometimes there is an obscure line of a somewhat darker hue belting the body-whorl in this same variety.

This species varies a good deal in length and breadth. The average length may be taken at about two inches, and the width across the body-whorl at from more than an inch to $\frac{6}{8}$ths of an inch.

Bulinus fictilis. *Bul. testâ subpupiformi, anfractibus sex ventricosis, lineis incrementi obliquis fortioribus, peristomate interrupto, expanso, crassiusculo, labro expanso, aperturâ subauriculari, suprà subangulatâ, albâ.*

Var. *a. Nitidè fusca strigis, punctis, lineisque albentibus notata, anfractûs basalis vittâ suturali angustâ subalbidâ.*

Var. *b. Albescens, strigis maculisque castaneo-nigricantibus longitudinalibus, clarioribus.*

Var. *c. Flavescens, lineis strigisque longitudinalibus albentibus, anfractûs basalis fasciâ angustâ obscurâ.*

Var. *d. Griseo-albens vel albens, strigis longitudinalibus albidis.*

Hab. in insulâ Philippinâ Cuyo dictâ.

Legit H. Cuming in sylvis.

In var. *a.* the dark ground-colour of the shell is striped, and powdered, as it were, with the whitish *epidermis*; in var. *b.* this whitish *epidermis* predominates, so that the longitudinal zebra-like stripes arising from the exposure of the dark brown, but shining ground-colour, are comparatively distinct. Var. *d.* seems to be the albinostate of the species. General length about 1$\frac{5}{8}$ths inch; breadth about $\frac{5}{8}$ths.

Bulinus larvatus. *Bul. testá elongato-pyramidali, gracili, subdiaphanâ, lineis incrementi obliquis, aperturâ auriculari, supernè angustatâ, labro crasso, expanso, recurvo, fuscâ strigis pallidis obliquè longitudinalibus, distantibus, variâ; aperturâ albâ; labri margine externo infernè fusco limbato.*

Hab. in insulâ Cuyo.

Legit H. Cuming in sylvis.

It is not without doubt that I have separated this shell specifically from the last; but in addition to the difference of shape, the colouring matter, here again, instead of stopping short just above the outer lip, where it begins to expand, as is the case with *Bul. fictilis*, is carried on and over the external expanse of the outer lip, so as to constitute a coloured rim on its lower external edge. In other respects there is much similarity between the two. General length about 1$\frac{1}{2}$ inch; breadth across body-whorl rather more than half an inch.—W. J. B.

Following is the continuation of Mr. G. B. Sowerby's paper:—

Helix decipiens. *Hel. testá globosá, tenuis, lævis, haud nitens, striis incrementi subtilissimè striata, plerumque pallescens, nonnunquam unicolor, sæpius zonis duabus nigris ornata; anfractibus quatuor, rotundatis, ultimo maximo; aperturá subcirculari; peritremate reflexo, albo, columellá albá, subincurvá, rectiusculá.*

Long. 1·2, lat. 1·35.

Hab. supra folia arborum ad insulam Marinduque, Philippinarum.

The appearance of the different varieties of this species might lead to the supposition that they were distinct species, in consequence of the peculiarities of the outer portion of the epidermis. The whole epidermis of this species seems worthy of particular notice: it consists of an inner coat, which is rather thick, horny, apparently strongly adhesive, and of a greenish brown yellow colour; and of an outer partial coat, which is white and hydrophanous, and which does not entirely cover the inner coat, but is variously arranged upon it in the different varieties. The following are the most remarkable varieties:—

a. Shell brown, with two very dark-brown spiral bands, a lighter antesutural band, and a very dark columellar band. Lip white at the back as well as in front. From the island of Marinduque.

b. Shell coloured similarly to the last, but having its outer surface slightly rugulose. From the same locality.

c. Shell coloured similarly to the two former, but with an external white epidermis disposed in slightly interrupted spiral bands. Found on the leaves of trees in Tayabas, in the province of Tayabas, Island of Luzon.

d. Shell light brown, with a dark-coloured antesutural band, and very dark columellar band; external white epidermis disposed as the last. From the same locality.

e. Shell brown, not banded, with the white external epidermis disposed in irregular and interrupted lines, nearly following the direction of the lines of growth, but increasing in width so as to form an interrupted band at the circumference of the shell. Found on the leaves of small trees on the island of Capul.

f. Shell pale brownish yellow, with the white external epidermis similarly disposed, but forming two rather broader and less interrupted bands, one at the circumference and the other anterior. From the same locality.

g. Shell white, with alternating light and dark brown bands; antesutural line and band round the columella dark brown. From Ligao, South Camarenis, island of Luzon: found on the leaves of trees.

h. Similar to *g*, but the alternating bands are dark brown and black; the antesutural line and the band round the columella also are black. From Pasacao, South Camarenis: found on the leaves of trees.

i. Similar to the last, only destitute of the central brown band. From the same locality as *h*.

k. Shell white, with three brown bands; antesutural line and columellar band of the same colour. From Ligao.

l. Shell white, with two brown bands; antesutural line and columellar band of the same colour. From Ligao.

m. Shell white, with a single brown band at its circumference. From Ligao.

n. Shell white, with alternately very pale and dark brown bands; antesutural line and columellar band dark brown. From Ligao.

o. Shell very pale brown, with a very thin epidermis; two dark brown bands, the one before and the other behind the light brown circumferential band; antesutural line and columellar band dark brown. From Ligao.

p. Shell totally white. Also from Ligao.

Helix opalinus. *Hel. testa pyramidalis, conica, obtusa, hyalina, tenuis, albido-viridescens, lævis, nitida, striis incrementi tenuissimis solùm sculpta; anfractibus senis, subconvexis, ultimo anticè obtusè subcarinato; suturâ distinctâ, anticè lineâ albâ angustissimâ; aperturâ obliquâ, subrotundatâ, supernè basi ultimi anfractûs ferè planâ modificatâ; peritremate subreflexo, propè columellam subincrassato; columellâ albâ, subincurvâ, sulco subobsoleto circumdatâ.*

Long. 1·25, lat. 0·8.

Hab. supra folia fruticum propè St. Jaun, Provinciam Cagayan Insulæ Luzonicæ.

A remarkably delicate species, having nearly the form of *Helix pileus*; it is, however, narrower in proportion to its height, its volutions are less numerous, and rather more convex. This elegant species has the usual colour and semitransparency of the *Semi-Opal*, which, however, becomes rather greener towards the base.

Helix cincinnus. *Hel. testa ovato-pyramidalis, tenuis, lævis, plerùmque nitida, subhyalina; epidermide albo fuscoque variâ, haud nitidâ nonnunquam induta; spirâ elatiusculâ, obtusâ; anfracti-*

bus senis, convexiusculis, solùm striis incrementi tenuibus indutis; suturâ distinctâ; aperturâ subovali, posticè acuminatiusculâ, supernè basi anfractûs ultimi rotundatâ modificatâ, sinistrorsùm sinuatâ; peritremate angusto, reflexo; columellâ albâ, anticè perobliquè subtruncatâ.

Long. 1·8, lat. 1·1.

Hab. supra folia arborum ad Insulas Philippinas.

Another very variable species, particularly in its colouring and in the characters dependent upon its epidermis. Numerous, however, as its varieties are, and abundant as the species is, it does not appear to have been described either by Lamarck or De Férussac; indeed, I have not been able to find any species nearly approaching it, except *Helix ventricosa*, De Fér., which is figured in Chemn. vol. ix. f. 1007, 1008, and which somewhat resembles the banded variety of our shell. The following varieties have been brought by Mr. Cuming:—

a. Shell white, last volution pale green, which is darker in its anterior part. From the island of Rumblon.

b. The same as *a*, but having a dark brown band surrounding the columella. On some specimens of this variety the remains of a dark brown epidermis is to be seen about the anterior part of the last volution. From the island of Burias.

c. Shell white, with a pink band surrounding the columella, and scattered remains of a dark brown epidermis on the last volution. From Temple Island.

d. Shell white, with a dark brown band surrounding the columella, and scattered remains of a dark brown epidermis on the last volution. From the island of Burias.

e. Shell rose-colour, with scattered remains of a dark brown epidermis about the anterior part of the last volution. From Temple Island.

f. Shell red-brown, with a dark brown band surrounding the columella, and scattered remains of a dark brown epidermis about the anterior part of the last volution. From Temple Island.

g. Shell light red-brown, with a dark brown band surrounding the columella, and mottled with a nearly white, hydrophanous and a dark brown epidermis, which becomes altogether darker coloured toward the anterior part of the last volution. From the island of Burias.

h. Shell pink, epidermis as in *g*. From the island of Burias.

i. Shell white, with the dark brown columellar band and epidermis as in *g*. From the island of Burias.

k. Shell white, very pale greenish toward the anterior part of the last volution, with a broad dark brown columellar band, a narrow brown band at the circumference of the shell, and a pale antesutural brown band. From the island of Burias.

l. Coloured as *k*, but with broader and darker bands. From the same locality.

BULINUS OVOIDEUS, Brug. *Bul. testa ovato-oblonga, ovoidea, alba lævis, striis incrementi exilissimis obliquis solùm sculpta, zonis* *nigris variis plerumque ornata; anfractibus quinque subventricosis, ultimo spiram ferè duplo longiori, aperturâ subovatâ, posticè subacuminatâ, intùs albâ, zonas exhibentibus; peritremate reflexo, albo; columellâ rectiusculâ, labio columellari subincrassato, anticè reflexo, ad labium externum adjuncto.*

Hab. ad insulam Ticao Philippinarum.

This species has been inadvertently figured in the 'Conchological Illustrations' under the name of *Luzonicus*, having previously been figured by De Férussac in his 'Hist. Nat. des Mollusques terrestres et fluviatiles,' tab. 112. f. 5, 6, and described in the 'Encycl. Méthod., by Bruguière* under the name of *ovoideus*, which name must of course be retained. Bruguière's specimen was quite white; those figured by Lister and De Férussac had a single dark band. Mr. Cuming has brought the following varieties:—

a. White, the anterior part of the first three volutions light brown. From the island of Masbate, on leaves of trees.

b. White, with three broad brown bands close behind the suture.

c. The same as the last, with an additional black band in front of the postsutural band.

d. White, with a narrow brown band behind the suture.

e. Brownish white, with perfectly white antesutural band, and three very broad dark brown bands.

f. White, with two dark brown bands, both anterior to the circumference of the shell.

g. White, with a single dark brown band. This is the variety that has been figured in 'Conch. Illustr.,' Bulinus, f. 53, under the name of *B. Luzonicus*; it is also given in Guérin's 'Magazin de Conchyliologie' (1838), tab. 116. f. 2. under the name of *B. Costerii*: of course both these names must be abandoned in favour of the older name of Bruguière.

h. Entirely white. This variety is of smaller size than most of the others.

i. Apex reddish brown, ground-colour white; anterior part of the last volution pale brown, with three dark brown bands.

k. Apex white or pale reddish, antesutural band white; then two broad dark brown bands, nearly confluent; then a lighter brown band, sometimes nearly white; then a broad dark brown band; and finally, the circumference of the columella white.

l. White, with two dark brown bands in front, and a very narrow light brown band behind the circumference.

HELIX ALBAIENSIS. *Hel. testa subglobosa, depressiuscula, tenuis, lævis, alba, plerumque fusco-zonata, lineis incrementi tenuissimis solùm insculpta; spirâ subdepressâ, anfractibus 3½ subconvexis, ultimo maximo inflato; aperturâ extùs rotundatâ; peritremate albo, rotundato, reflexo, mediocri; intùs sinuatâ, sinu profundo, anticè per columellam, latiusculam, albam, posticè per modificationem anfractûs penultimi efformato; suturâ subinconspicuâ.*

Long. 1·2; lat. 1·5 poll.

---

* Hist. Nat. des Vers, tome vi. p. 335.

Hab. supra folia fruticum apud Matnog, Provinciam Albaiensem insulæ Luzonicæ.

The following three varieties of this new species have been discovered by Mr. Cuming, viz. :—

a. White, with a little light brown at the apex and outside the columellar lip.

b. White, with two brown bands, one anterior to, and the other posterior to, the circumference of the shell; a dark brown antesutural line and a dark brown band outside the columellar lip.

c. The same as *b*, with the two brown bands nearly meeting over the circumference.

Helix aurata. *Hel. testa depressiusculo-subglobosa, tenuis, lævis, subnitens, flava, apice roseo; spirâ rotundato-depressâ; anfractibus 3½ convexis, ultimo maximo; aperturâ semilunari, latâ, posticè basi ultimi anfractûs gibbosâ modificatâ; labio externo posticè paululùm coarctato, deinde subreflexo, albo, crassiori, rotundato; columellâ albâ, latâ, subincrassatâ; suturâ distinctâ.*

Long. 0·9; lat. 1·4 poll.

Hab. in foliis arborum ad St. Jaun Provinciam Cagayan Insulæ Luzonicæ Philippinarum.

Two varieties of this remarkable and beautiful species have been found by Mr. Cuming. The similarity of the young shell to *Helix picta* is very great: the full-grown shell differs, however, very much in shape from that species. Both varieties are remarkable for a bright red apex.

Var. *a.* Bright yellow, with a scarlet band placed just before the suture, beginning at the second volution and increasing in breadth with the growth of the shell: this var. has also a blue line on the outside a little in front of the scarlet band, which is black within.

Var. *b.* Upper half of the shell bright yellow; lower half white.

Helix Roissyana, De F. *Hel. testa subglobosa, crassiuscula, lævis, coloribus plerumque albo, nigroque fasciata, et ut assolent epidermide obscurâ, haud nitente, obtecta; spirâ obtusissimâ; anfractibus 4½, rotundatis, subventricosis, ultimo maximo, cæteris quadruplo longiori; suturâ distinctâ; aperturâ sublunari, intùs albâ, labii externi margine arctè revolutâ, nigrâ, columellari albâ; columellâ rectiusculâ, planulatâ, albâ s. albicante.*

Helix Roissyana, De Fér. 'Hist. Nat. générale et particulière des Mollusques terrestres et fluviatiles,' tab. 104. f. 2, 3.

Long. 1·2; lat. 1·4 poll.

Hab. propè Puerto Galero ad Insulam Mindoro, Philippinarum.

Five principal varieties of this species are remarkable; one alone has been represented, though not described by De Férussac. If the colours alone were to be depended upon as specific characters, two of these varieties would be considered distinct species. Deshayes has omitted to mention or to describe this species in his second edition of Lamarck (Anim. sans Vert.); I am therefore much gratified by having the opportunity afforded me of pointing out its characters and making known its several varieties.

Var. *a*. White, with a yellowish epidermis, a very dark brown, almost black, antesutural band, and a rather broad, black band surrounding the columella.

Var. *b*. The same as the last, with an additional broad intermediate anterior black band.

Var. *c*. Similar to the last, with the addition of a black band anterior to the sutural band, and with the anterior intermediate band much wider.

Varieties *a, b, c,* are all found at Puerto Galero.

Var. *d*. Nearly black all over, and only showing more or less distinct remains of white on the three first volutions; epidermis very thin and nearly colourless. Found at Calapan, in the Island of Mindoro.

Var. *e*. Of a dark chestnut-brown colour, with the same arrangement of colour as the last, but covered with a thickish, brown, opake, hydrophanous epidermis. From Puerto Galero.

I am compelled to regard as a variety of this species a shell which Mr. Cuming has brought from the island of Tablas, whose spire is more elevated, having nearly five volutions; it is of a dark colour, with more or less distinct lighter bands, and the same thickish, brown, opake, hydrophanous epidermis as the last: its columella, and the columellar lip, are of a brownish purple. I designate this as Var. *f*.

The figure given by De Férussac represents a rather dwarf variety, of which I have seen a specimen in Mr. Metcalfe's collection.

HELIX (COCHLOGENA, De F.) IGNOBILIS. *Hel. testa subgloboso-conica, tenuis, albicans, subhyalina, fasciis duabus castaneis ornata; spirâ subconoideâ; anfractibus* 4½, *lævibus, nitidis, subplanulatis, striis incrementi tenuissimis solùm sculptis; suturâ distinctâ; aperturâ subrotundâ, intùs albâ, fasciis duabus conspicuis; peritremate reflexo, rotundato, albo; columellâ rectiusculâ continuo.*

Long. 1·2; lat. 1·2 poll.

Hab. ad insulam Romblon, Philippinarum.

The subconical form of the spire, with very slightly ventricose volutions, distinguish this from all its most nearly-related species. When young it is slightly carinated. The anterior part of the last volution is usually coloured of a pale yellowish tint.

HELIX (COCHLOGENA, De F.) TENERA. *Hel. testa subglobosa, tenuis, alba, subhyalina; spirâ subacuminatâ, obtusâ; anfractibus* 4½, *lævibus, subventricosis, striis incrementi tenuissimis solùm insculptis, ultimo fasciâ angustâ, viridi picto; suturâ distinctâ; aperturâ subrotundâ, intùs albâ fasciâ solitariâ subinconspicuâ; peritremate tenui, reflexo, albo; columellâ latiusculâ, rectiusculâ, albâ, extùs anticè subangulatâ.*

Long. 1; lat. 1 poll.

Hab. propè Mansalai ad insulam Mindoro, Philippinarum.

Var. b. *fasciis duabus castaneo-nigris.*

Nearly related to the last (*H. ignobilis*): it may be distinguished by being rather smaller, by having its volutions rather more convex, its peritreme thinner, its columella straighter, and angular in front externally. A variety occurs with two dark brown, nearly black, bands, the one above and the other below the ordinary green band. The posterior of these is seen nearly up to the apex.

HELIX (COCHLOGENA, De F.) COLLODES. *Hel. testa subglobosa, tenuiuscula, nitida, alba; epidermide lutescente induta, apice roseo; spirâ subelatâ, obtusâ; anfractibus quinque, ventricosis, ultimo ad basin paululùm planulato; suturâ distinctâ, anticè castaneâ; aperturâ subrotundâ, intùs albâ; peritremate reflexo, nigricante; columellâ albicante, paululùm recurvâ.*

Long. 1·2; lat. 1·2 poll.

Hab. ad insulam Tablas, Philippinarum.

I have named this species *collodes*, in consequence of the remarkable appearance of the epidermis, like a coat of glue covering all the outer surface except the apex. In form this species is much like *H. ignobilis*; its spire is not, however, so much acuminated, and the apex is much more obtuse than in that species: its peritreme, moreover, is thinner, and although reflected, it is not rounded as in that species.

HELIX (COCHLOSTYLA, De F.) ORBITULUS. *Hel. testa subglobosa, crassiuscula, lævis, obliquè lineis incrementi tenerrimè insculpta; anfractibus 4½ ad 5, subventricosis, ultimo maximo, ventricosiori; suturâ distinctâ, anticè albâ; aperturâ subrotundâ, intùs albâ; peritremate latiusculo, rotundato, reflexo, albo; columellâ albâ, rectiusculâ, paululùm inflexâ.*

Long. 1·1; lat. 1·1 poll.

Hab. propè Mansalai ad insulam Mindoro, Philippinarum.

Var. *a*. Shell nearly globular; spire very obtuse, white, base dull yellowish; two spiral green bands commence at about the third volution, and increase in width and strength of colour until they reach the back of the outer lip; of these the lower is by much the broader.

Var. *b*. Shell *oblong*, and coloured in the same manner as the last; but the last volution is green above (the anterior side of the suture being always pure white), increasing in intensity from its commencement: in this variety the dull yellowish colour of the anterior or basal part of the last volution is much deeper than in var. *a*.

Var. *c*. Shell larger; its volutions rather more ventricose, similar to the last in colouring, but having two additional dark brown, nearly black bands, which are distinctly seen within. This is by far the largest and handsomest variety of the three.

Note.—" M. Valenciennes informs me that this species was brought in 1830 by the officers of the 'Favourite,' and placed in the galleries of the Museum of Paris, under the name of *H. chlorogrammica*, Val.; but as it does not appear that he has published either the name or any description of the species, I continue to use the name which I have given it above."

HELIX (COCHLOSTYLA, De F.) OOMORPHA. *Hel. testa ovato-oblonga, crassa, obscura, spiraliter tenuitèr substriata, lineis incrementi decussata; anfractibus quinque subventricosis; suturâ di-*

stinctâ; aperturâ suborbiculari, intùs obscurâ; peritremate ferè continuo, albo, reflexo, rotundato; columellâ subundatâ, labio columellari extenso, ad umbilicum fere velato; umbilico mediocri.

Long. 1·1; lat. 0·7 poll.

Hab. ad insulam Tablas dictam, Philippinarum.

Mr. Cuming has obtained only a single specimen of this species: it is very different from all the others, its peritreme being continuous nearly all round, the only interruption being about a seventh where it is intersected by the last volution; colour dull light brown, with a dark brown band in front of the suture; the greater part of the last volution dark brown, and having a light narrow band near the umbilicus in addition to the light band near the suture.

HELIX INCOMPTA. *Hel. testa ovata, tenuiuscula, obscura; epidermide fuscâ, haud nitente induta, obliquè tenuiter lineis incrementi striata; anfractibus quinque subconvexis, ultimo majori; suturâ distinctâ, anticè posticèque fuscâ; aperturâ subrotundâ, posticè subacuminatâ; peritremate tenuiter reflexo, rotundato, anticè subtruncato, albo; columellâ rectâ, albâ, anticè subtruncatâ.*

Long. 1·1; lat. 0·66 poll.

Hab. ad insulam Tablas dictam, Philippinarum.

Nearly resembling the last in shape and in its dull surface, but differs in having no umbilicus, and in its peritreme not being nearly so continuous. The last volution has its suture brown, a brown band in the middle and another round the columella. A single specimen only was found.

HELIX STABILIS. *Hel. testa ovoidea, solidiuscula, lævis, nitidiuscula, alba; anfractibus senis, paululùm convexis, anticè castaneis, nigro-fasciatis, obliquè lineis incrementi striatis; aperturâ obliquâ, subovatâ, intùs albâ, peristomate albo, incrassato, rotundato, anticè subeffuso; columellâ albâ, inconspicuâ, labio columellari paululùm expanso.*

Long. 1·35; lat. 0·8 poll.

A species which in general appearance bears some resemblance to *Bulinus ovoideus* of Brug. and De F., tab. 112. f. 5, 6. (the same as *B. Luzonicus*, 'Conch. Illustr.' Bulinus, f. 53.); this species, however, increases more rapidly toward the anterior part; it has, moreover, one more volution. The aperture is placed very obliquely, so that the shell stands firmly when placed upon it. The dark burnt colour of the anterior part of this shell is seen in every volution in the form of a spiral postsutural band. It has a thick light-coloured epidermis, of which some traces have not been entirely effaced.—G.B.S.

WERNERIAN NATURAL HISTORY SOCIETY OF EDINBURGH.

April 17, 1841.—Professor Jameson in the Chair.

A paper was first read "On the Nature and Currents of the Atmosphere, and their Influence on the Variations of the Height of the Barometer." By William Brown, Esq.

Mr. Goodsir then read a paper "On a new Genus, with descriptions of some new Species of *Pycnogonidæ.* With specimens and drawings." By Mr. Henry Goodsir, Surgeon, Anstruther.

Of the genus *Orithegia*, one species was described, *O. globosa*; of *Pallene* one species, *P. circularis*; of *Nymphon* four species, *N. pellucidum, spinosum, minutum, Knoxii*; and one species of a new genus, *Pephredo,—P. capillata.* One of these new Crustaceans was taken in Orkney, the others in the German Ocean and Firth of Forth. The paper concluded with some observations on the circulation in this family, and on the generative organs, the orifices of which the author has detected on the under surface of the body, at the insertion of one of the pairs of legs.

Mr. Goodsir then communicated a paper by Mr. Forbes and himself, "On a new genus of Ascidian Mollusks." This genus the authors styled *Pelonaia*, and characterized thus: *Testa* cylindrical, unattached; orifices without rays, on two equal, approximated, papillose eminences at the anterior extremity. They described two species,—*P. corrugata*, from the Firth of Forth, and *P. glabra*, from Rothsay Bay. The anatomy of both species was given in detail, and differed from that of the attached *Ascidiæ* in its perfect bilaterality. The authors adverted to the value of the genus as a connecting link between the Molluscous and Annulose animals, and referred to its analogical relations to certain of the *Echinodermata*.

ROYAL SOCIETY OF EDINBURGH.

May 3rd, 1841.—Lord Greenock in the Chair.

The first communication was entitled "Experimental Researches on the Production of Silicon from Paracyanogen." By S. Brown, M.D.

The author had intimated in a former paper that he had been led to infer from experiment, that two familiar substances, long and universally regarded as distinct elements, are only modifications of one and the same material form; and having extended his inquiries, he now ventures to maintain that carbon and silicon are isomeric bodies. The method in which he establishes this proposition is very simple, and consists in the description of a number of processes by which carbon may be transformed into silicon; and crucial experiments, intended to prove that there is no intelligible source of fallacy in the processes which are given. Accordingly, the present communication is of a purely practical character. It is composed of five sections: the first treats of the production of silicon from free paracyanogen; the second, of the formation of amorphous mixed siliciures of copper, iron, and platinum, by the reaction of paracyanogen on these metals; the third, of the quantity of nitrogen separated from paracyanogen when it is changed into nitrogen and silicon; the fourth describes processes for the preparation of definite and crystalline siliciures of iron from the paracyanide of iron, and from the ferrocyanide of potassium; and the fifth gives easy formulæ for the extraction of silicic acid from the ferrocyanide of potassium by the action of carbonate of potassa.

Our reason for noticing this investigation in a periodical devoted to the objects of natural history, is this: If Dr. Brown's observations be corroborated by those who repeat his singular experiments, there will be opened up a new sphere of geological inquiry of the highest order. With the aid of a transelemental chemistry (for we understand Dr. Brown has transformed several other elementary forms besides carbon) we may approach the subject of the molecular genesis of the earth; and the geological relations of carbon and silicon are certainly sufficiently striking to warrant the entertainment of this hope. As it is, there are several points in natural history which seem to be illustrated by the particular case of transformation now in hand. As one instance, we would specify the siliceous character of many organic remains found in circumstances in which the source of silicon is perplexing and unintelligible.

In the discussion which followed, Professor Traill remarked, that though he had not had an opportunity of repeating Dr. Brown's experiments, yet, from his acquaintance with that gentleman, he had a strong conviction of their value; and this notwithstanding the very startling principles and extraordinary conclusions to which they necessarily led. He had no hesitation in saying, that since the early days of Davy, when that great chemist brought the metalloids to light, no investigation had been made approximating in importance to the present, whose publication would do honour to the Society, and whose interest, as it regarded the subjects of Botany, Palæontology and Geology, in its widest range, was altogether unbounded.

Professor Christison begged to meet a statement which he understood had gone abroad, that he had given a guarantee to the accuracy of these investigations. This was by no means the case. The fact was, that, now for some time otherwise employed, he was not capable even of testing these admirable experiments: no one, in fact, could do so but a first-rate analytic chemist, perfectly master of the most recent manipulations of the laboratory; and he would warn every one against coming to a decision regarding these conclusions, well styled *startling*, either for or against, without such preliminary investigation. At the same time, it was true that he had been familiar with the details of the inquiry; he had searched, along with the author, but in vain, for grounds of fallacy, and he formed the very highest estimate of their value and importance.

Professor Syme communicated a paper by Mr. Goodsir, "On the Anatomy of *Amphioxus lanceolatus* of Yarrell."

After a short statement of the labours of Yarrell, Couch, Retzius and Müller, the author gave a detailed description of the structure of *Amphioxus,* as observed in the dissection of one of two specimens taken by Mr. Forbes in the Irish Sea. The abdominal folds, and the anterior and posterior anal fins were described, and the existence of a fin in front of the anus illustrated by an observation made by Professor Agassiz, of the temporary existence of a similar fin in the embryos of certain freshwater fishes.

The osseous system presented two divisions,—the true or neuro-skeleton, and the intestinal or splanchno-skeleton. The true skeleton consisted of a chorda dorsalis, equally pointed at both extremities, without the slightest trace of a cranium, and destitute of any of the peripheral vertebral elements, with the exception of a row of cells—

germs of interspinous bones and fin-rays—along the base of the dorsal and anal fins. The tissue of this neuro-skeleton was not even cartilaginous, consisting merely of membrane and globular nuclei, derived from the original elementary cells. The splanchno-skeleton consisted of a hyoid apparatus, and of 70 to 80 pairs of elastic filamentous ribs. The hyoid apparatus—in two divisions, with 17 pieces in each—exhibited 34 rays, pointing inwards, and each springing from one of the 34 basal elements of the hyoid bone. These rays the author looked upon as developments of the tubercles and teeth of the central aspect of the branchial apparatus of the higher fishes, and not as branchiostegal rays. The ribs were enveloped in the mucous membrane of the intestine, and each alternate pair bifurcated below, to enclose the abdominal longitudinal vessel or heart. From these circumstances, and from other considerations, the author looked upon the ribs of *Amphioxus* not as true ribs, but as splanchno-ribs—repetitions of the hyoid bone—analogues of the tracheal and bronchial cartilages of the higher Vertebrata. The tissue of the splanchno-skeleton is more advanced than that of the neuro-skeleton; the ribs are cartilaginous; the hyoid bones hollow cartilages, with isolated cells or nuclei in their interior.

The nervous system presents nothing more than a spinal cord, without a trace of cerebral development, and from 60 to 70 pairs of spinal nerves. The spinal cord was in the form of a ribbon, pointed at both ends, with a dorsal median groove, and a line of black or grey matter; was composed of nucleated cells, without tubes or fibres, and gave origin to the nerves in single roots only. The nerves were all symmetrical, dividing into dorsal and ventral branches. The second pair sent back a dorsal and a ventral branch, to join the corresponding branches of the other nerves, along the sides of the body, and along the bases of the dorsal and anal fins; from which distribution the author was inclined to believe, that although the second pair in *Amphioxus* presented certain resemblances to the vagus, it was, in reality, the trifacial.

The vascular system consisted of a straight abdominal vessel, the branchial artery or heart, without any trace of valves or division into cavities. This vessel sent off lateral branches, which passing up on the internal surface of the intestine, along the ribs, communicated by a capillary respiratory system of vessels with a dorsal trunk or aorta.

The intestinal tube was straight from mouth to anus, its anterior half dilated, strengthened by ribs as described above, and its entrance guarded by the hyoid rays. This dilated portion of the canal received sea-water, as in the *Ascidiæ*, to act on the respiratory vascular ramifications on its internal surface, which is undoubtedly ciliated in the living animal. The digestive portion of the canal is narrow, and presents not a trace of a liver, or of any other assistant chylo-poietic viscus.

As there was no trace of branchial fissures—as the ribs were too numerous to be looked upon as true branchial arches (branchial arches alternating with branchial fissures)—and as the other organic systems were in the condition of those of an embryo before the appearance of branchial clefts, the author was led to the conclusion that the *Amphioxus* had never had, at any period of its existence, branchial clefts;—that it was an animal which had arrived at its perfect development before the branchial clefts had appeared, and, consequently, with an undeveloped osseous and nervous system, without a liver, and with an unilocular heart.

After examining the generative organs, and other departments of its anatomy, the author entered upon the consideration of the zoological position of *Amphioxus,* which he observed could no longer be ranked with *Petromyzon* and *Myxine,* but must take an ordinal place in any new arrangement of the class. In conclusion he remarked, that although genera allied to *Amphioxus* might now be rare, yet in the ages which have passed since the development of organic forms commenced, *Abranchiated* fishes may have been more common, and may yet afford subjects of research to the palæontologist.

XXXVII.—*Information respecting Zoological and Botanical Travellers.*

May 27.—The subjoined letter, giving news of our friends Mr. Forbes and Mr. Thompson, has arrived just in time for insertion; and our wish to communicate it to our readers must be our excuse for omitting several articles. A letter from Mr. Schomburgk, dated Demerara, April 6, informs us that he was just setting out on a two months' expedition, intending to return in June, and to start again at the latter end of August.

To Richard Taylor, Esq.

My Dear Sir, Syra, 7th May, 1841.

According to my promise, I send a letter for the Annals, giving a sketch of our natural history proceedings, so far. I hope the news may interest my brother naturalists at home.

Best respects to all friends for myself and Mr. Thompson.

Believe me ever, dear Sir, most sincerely yours,
Edward Forbes.

On the 17th of April Mr. Thompson and I arrived at Malta, and found the Beacon about to sail for the Archipelago. During the four days we remained at Valetta we made some short excursions into the country, and were rewarded, amongst other things, by finding *Clausilia syracusana* in abundance, a species hitherto unrecorded out of Sicily. We left on the 21st, and directed our course to the Morea, proposing to water the ship at Navarino, and were a week on the passage, the winds being very light, and the weather delightfully fine, which afforded a favourable opportunity for making observations on the pelagic animals of the Mediterranean. The tow-net was overboard, and the hand-net in requisition whenever it was possible, but hitherto we have not met with that abundance of floating life which so delights the explorers of more northern seas. *Medusæ* have been few and far between, three or four species only having been seen, and but few individuals of each. Few floating creatures ap-